[redacted]

ECE 340
Sept. 8, 2017

HW02: #14, §1.3 & #33, §1.5
& Problem from class $P(\text{sick} \mid \text{test}+) = .95$

14) We roll two fair 6-sided dice. Each one of the 36 possible outcomes is assumed to be equally likely.

a) $\frac{\#\text{favorable}}{\#\text{total}} = \frac{6}{36} = \frac{1}{6} \boxed{\cong 16\%.}$

b) sum < 4

rolls: (1,1), (1,2), (2,1), (2,2), (3,1), (1,3)
1 2 3 4 5 6
* *

$\frac{2}{6}$ are less than 4 $\therefore \frac{1}{3} \boxed{= 33\%.}$

c) (6,6), (6,i), (i,6) 11 outcomes
1-5 1-5
1 5 5

$\frac{11}{36} = .305 \boxed{\cong 30.5\%.}$

d) Six pairs, 30 options.

$\frac{10}{30} = \frac{1}{3} \boxed{\cong 33\%.}$

33) They could flip the coin twice -
if you get T-H, go to the opera.
or if you get H-T, see a movie.
If you get H-H / T-T, flip again.

3) $P(\text{Sick}) = .03 = 3\%$

$\rightarrow P(\text{Healthy}) = .97 = 97\%$

* $P(\text{Sick} \mid \text{Test Positive}) = .95$

* What we want - 95% confidence

$P(\text{Test Positive} \mid \text{Sick}) = .98 = 98\%$

$P(\text{Test Positive} \mid \text{Healthy}) = .02 = 2\%$

$$P(\text{Sick} \mid \text{Test Positive}) = \frac{P(+|S)P(S)}{P(+|S)P(S) + P(+|H)P(H)}$$

$$\left(.95 = \frac{.98(.03)}{.98(.03) + P(+|H)(.97)}\right)\left[.98(.03) + P(+|H)(.97)\right]$$

$$= .9215(P(+|H)) = .00147$$

$$\boxed{P(T|H) = .0016}$$